

PAPERS.

13. On the Fossil Carnivores *Cynodictis intermedius* and *Cynodon gracilis* from the Phosphorites of Quercy. By ALBERTINA CARLSSON*, Zootomical Institute, University of Stockholm.

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(Plate I.†)

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Among the fragmentary fossils of Carnivora from the Phosphorites of Quercy which belong to the collections of the Zootomical Institute in Stockholm, and which Professor Leche has requested me to examine, there were two which excited my special interest.

CYNODICTIS INTERMEDIUS. (Pl. I. figs. 1-3.)

One was a part of a skull, consisting of the well-preserved brain-case and a fragment of the face. In the Catalogue it is designated No. 2216, *Cynodictis* sp. Comparing it with the descriptions of Filhol (1, p. 116) and Schlosser (4, pp. 40 & 47), I have identified it as *Cynodictis intermedius*.

As we know very little about the skull of this species, or about that of most species of the same genus—Filhol knows only the foremost part of the face,—I will here give its characters.

The skull in question belongs to an adult animal, for only the sutures between the squamosals and the frontals, as well as those between the basioccipital and the basisphenoid, can be seen.

The head, which, as in other forms of *Cynodictis*, is long and not very broad, has a brain-case which, in its narrow and elongated form, resembles more that of the recent Viverridæ than that of the now living Canidæ (fig. 1).

Filhol (1, p. 72) says of *Cynodictis boriei*:—"La masse cérébrale devait être proportionnellement petite par rapport à la taille de l'animal." As in *Cynodictis gryei* (1, pl. 19), the face seems to be comparatively more developed than the brain-case, the frontals—if it is allowed to judge from the distance between the orbits—being comparatively broader than in the Viverridæ. The crista sagittalis has attained a much higher degree of development than in Viverridæ and Canidæ of the same size. As in the Viverridæ, the crista occipitalis is high, and consequently the height of the supraoccipital is considerable (fig. 2).

* Communicated by OLDFIELD THOMAS, F.R.S., F.Z.S.

† For explanation of the Plate see p. 230.

As in the Canidæ, the foramen condyloideum (fig. 3, *cond.*) is situated far behind the foramen lacerum posterius (*lac.*); in the Viverridæ, as is well known, these foramina open into a common fossa, separated from each other only by a bony bridge. Also, with regard to the foramen glenoideum, the skull in question agrees with that of the Canidæ, this foramen being here rather distinct; in the Viverridæ it is represented by an extremely small opening.

The canalis alisphenoideus (*alisph.*) is longer in *Cynodictis intermedius* than in the two above-mentioned families, and consequently the alisphenoid is of greater length in the former than in the latter. Below the posterior nares the border of the palatines terminates in a ridge; such a ridge is not to be seen in the Canidæ or in the Viverridæ, but is found, more or less developed, in *Propithecus*, *Erinaceus*, *Perameles*, *Myrmecobius*, and *Sinopa* (3). The bullæ osseæ are not preserved, probably on account of having been loosely attached to the skull, as they are still found in young bears and in *Paradoxurus*. No doubt they were ossified, as is the case in *C. boriei* and *C. gryei* (1, pp. 73 & 79). From the form and the direction of the processus par-occipitales (*pr.*), it appears that they have not, as in the Viverridæ, been spread over the hinder surface of the bullæ, but have been separated from them as in the Canidæ.

The petrous bone is pear-shaped; on its lateral side there is a deep fossa. As the foramen stylomastoideum (*styl.*) opens into it, it must be formed by a portion of the mastoid.

Thus the skull of *Cynodictis* agrees partly with the Canidæ and partly with the Viverridæ. Though in most respects it agrees with the former, especially with regard to the basis cranii, the form of the brain-case indicates kinship with the latter. Such a kinship has been stated before by Filhol on account of the result of his examination of the teeth and the tooth-formula of the lower jaw of several species of *Cynodictis*.

CYNODON GRACILIS. (Pl. I. figs. 4, 5.)

The other fragment was part of a skull of *Cynodon gracilis* designated No. 1621. Of this species Filhol has described only the lower jaw (1, p. 120); the skull was as yet unknown. A short description of the fragment in question may therefore be of interest. It consists of a tolerably well-preserved part of the face; on the right side the anterior part of the zygomatic arch remains, on the left it is totally absent. The brain-case is not entire, but its length and outlines can be seen. Of the basis cranii, the portion of the basisphenoid which borders on the pterygoids was preserved.

Of the lower jaw there are four fragments of different size; in two of them the three posterior premolars and the two anterior molars are found; a left half of the lower jaw shows

the alveoli of \overline{C}_1 , \overline{P}_1 , \overline{P}_2 , and fragments of \overline{P}_3 , \overline{P}_4 , and \overline{M}_1 ; a right half contains the canine, the premolars, and the molars. The small size of the examined object is very remarkable. According to Filhol (1, p. 12), \overline{P}_1 measures 5.5 and \overline{M}_1 8 mm. in length; however, I found that the corresponding teeth measure 4 and 5.5 mm. respectively. But it must be borne in mind that, according to Schlosser (4, p. 54), in the specimen of *Cynodon gracilis* in the Museum of Munich, \overline{M}_1 is not quite as long as that of the specimen examined by Filhol, and that there is a possibility that this skull belonged to a female or to a small specimen. How widely the size of the skull of Carnivora varies has been shown by Hensel (2).

That we have here to do with *Cynodon gracilis*, and not with *C. velatus*, *C. aimardii*, *C. speciosus*, or *C. leptorhynchus*, is evident, as all these, which also occur in the Phosphorites of Quercy, are larger than *C. gracilis*.

The sutures between the maxillaries and the frontals, those between the latter and the nasals, those between the jugal and the maxillary, as well as the outlines of the lachrymal, and those of the orbitosphenoid are very distinct—showing that the specimen is young. There is, however, a crista sagittalis (fig. 5). In *Cynodon gracilis* the canalis infraorbitalis opens above \overline{P}^3 , in *Cynodon leptorhynchus*, according to Schlosser (5, p. 115), above the interspace between \overline{P}^3 and \overline{P}^4 , which probably depends on the greater length of the jaws of the latter. The nasals are very short, and consequently the anterior nares have an oblique direction as in *Cynodictis gryei*, and as in the last-mentioned animal the nasals stretch between the frontals above the maxillaries (1, pl. 19. fig. 58). Judging from the strength and direction of the preserved part of the jugal, the zygomatic arch seems to have been strong and wide, thus differing from that of *Cynodon leptorhynchus*, of which Schlosser states:—"Jochbogen schlank, wenig gekrümmt" (5, p. 115).

The upper incisors are separated by small gaps. The upper C measures 7.5 mm. in height; \overline{P}^1 has one root, and stands at some distance from the canine. \overline{P}^2 and \overline{P}^3 are of the same form as \overline{P}_2 and \overline{P}_3 , but of smaller size. As to \overline{P}^4 , it has a strong cingulum, as have the anterior premolars; its anterior cusp is higher than the posterior. Only its labial side was to be seen, which was also the case with \overline{M}^1 and \overline{M}^2 . The height of the two latter teeth is 5 mm. (fig. 4).

The lower jaw and its teeth have been most satisfactorily described by Filhol (1, p. 120).

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EXPLANATION OF PLATE I.

Cynodictis intermedius.

- Fig. 1. Skull, upper view. 1/1 nat. size.
 2. Skull, seen from behind. 1/1 nat. size.
 3. Basis cranii. 1/1 nat. size.

alisph. Canalis alisphenoides; *cond.* Foramen condyloideum;
gl. Foramen glenoideum; *lac.* Foramen lacerum posterius;
ov. Foramen ovale; *pr.* Processus paroccipitalis; *styl.* Foramen
 stylomastoideum.

The hatched parts of the figures represent lost portions
 replaced by cement.

Cynodon gracilis.

- Fig. 4. Part of the skull, right view. 1/1 nat. size.
 Only the roots of $\overline{M^1}$ and $\overline{M^2}$ are left. The top of $\overline{P^3}$ is lost.
 5. Part of the skull, upper view. 1/1 nat. size.